

MAY 6.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-one persons present.

*Pairing of Spiders, Linyphia marginata.*—Rev. H. C. McCook remarked that on the afternoon of June 14, 1878, he witnessed the pairing of a male and female of *Linyphia marginata* at Bellwood, Blair Co., Penna. The spiders were first observed at a quarter before 4 o'clock P. M. They were hanging inverted in the dome-shaped nest of the species, in line with each other, and about three-quarters inch apart. Each hung within a smaller dome, delicately but perceptibly defined, that rose within the summit. These were perhaps formed by the outspread feet drawing down the inner surface of the dome.

The position of these individuals seeming to indicate the act of copulation, he arranged himself before them as comfortably as possible for observation. The nest was hung from the lower surface of an end of a plank that jutted over from a pile of lumber, about two and a half feet from the ground, so that, seated before the nest, his face was on a level with the spiders. The male reached out one foot cautiously toward the female, pulling upon the threads. He turned a moment to adjust the block on which he sat, and, on again looking, the two were in embrace. The female was suspended in the same position as before, although turned at right angles to the line on which she hung when first seen. The head of the male was laid against the sternum of the female, the abdomen inclined a little upward, the forelegs interlocked with or rather interlaid upon those of the female. Both spiders were suspended by threads, in the normal way. This was at 9 minutes before 4 P. M. After a moment's embrace the pair separated; the female made a circuit of the lower part of the dome, moving in an excited, jerking manner, then returned to the summit. The male approached, the female stretching out her forelegs somewhat, as he laid his two forelegs within them, which position was maintained, as was the relative position of the two during the entire period of copulation. The female during the act remained perfectly motionless except an occasional twitching of the apex of the abdomen.

The two terminal bulbs upon the male palp were laid upon the epigynum of the female, and pressed downward. From one of these issued the sac, a bean-shaped organ, of a bright amber color, and translucent, which shone brilliantly in the sun that fell full upon it from the west. It remained thus projected, held between the finger-like tufted horn of the bulb, for a brief space, was then

gradually contracted and withdrawn within the black corneous bulb, which was meanwhile pressed eagerly against the epigynum. A small elbow or projection upon the upper part of the bulb seemed to press within the spermatheca of the epigynum. The two bulbs were laid simultaneously upon the tubes of the spermathecæ, but the inflated sac appeared in but one bulb at a time; the latter action alternated in the bulb. There was a prolonged squeezing motion of the bulbs, as though pressing into the spermathecæ, and at times a corresponding motion in the abdomen of the female, especially at the apex. With this exception the female remained motionless during the whole period of copulation. After application as above the male bulb was slowly, for the most part, but sometimes rapidly, raised, bent upward, and apparently clasped upon the falces or lower margin of the face, which parts of course were upward. Three or four movements back and forth in this clinched position followed, when the series of motions above described was repeated.

In the meanwhile the other bulb remained upon the other tube until the first bulb began to descend, when it in turn was elevated, and the same motion made. As the bulb descended the sac began to inflate and issue. The above is the process as it was quite regularly repeated. Sometimes, however, both bulbs were clinched upon the falces at the same time; sometimes the movements of the bulb were more rapid than at others. The bulbs had the appearance of having been moistened by some secretion, presenting the peculiar gloss which a colorless liquid gives to a black surface, but he could see no secretion otherwise, although he was able at any time to use his pocket lens with the exercise of a little care.

At twenty minutes before 6 six o'clock he was compelled to leave, at which time the pair had been in embrace one hour and forty-nine minutes. At six o'clock twenty-eight minutes he returned, and found the pair in precisely the same positions. He remained five minutes, and then left an intelligent young man at the post, with full instructions as to points of observation. He reported that at thirteen and a half minutes to seven P. M. the pair parted very suddenly. The male ran downward to a portion in the lower margin of the dome pursued by the female, who stopped suddenly just above and turned back to the central point in the summit of the dome. Shortly after receiving this report Mr. McCook visited the nest and found the female suspended motionless in this position and the male at the point to which he had fled, feeding upon a small fly. The next morning at seven o'clock the female was in the same position, and the male had disappeared. He attempted to capture the female, but she ran among the boards and escaped. The pair had thus been in union two hours and fifty-five and a half minutes.

During this period they were separated a number of times.

Nineteen of these interruptions were noted; one was caused by a small fly striking the snare, which the male darted at in a fierce manner, but failed to seize, as the fly broke loose before he reached it. Others were caused by the observer touching the foundation threads or other parts of the nest. Toward the close of his observations he accidentally broke the suspending lines nearest to him and so caused one side of the dome to fall in. This made only a momentary interruption. Many of these separations were, however, apparently without any extraneous cause. Twice the male ran to one side of the dome, made a web attachment to a bit of leaf hanging in the snare, drew out a thread about two and a half inches long, which he overlaid a couple of times, and then made the following motion: First, the body was placed erect, *i. e.*, back upward, and was moved back and forth along the line, rubbing the points or "nippers" of the palps at the same time; then the spider swung over until the body made an angle of about  $45^{\circ}$  with the line, and while holding on thus the palps were rubbed back and forth alternately along the line as before. The process was repeated during another of the intermissions, as described above. It was conjectured that the purpose of this movement might be the distribution of the seminal fluid into the palpal bulbs. This is taken up by the sacs, by the inflation and contraction of whose membranous coats it is forced into the spermatheca of the female.

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MAY 13.

WM. S. VAUX, Vice-President, in the chair.

Thirty-three persons present.

*The Lateral Sensory Apparatus of Fishes.*—Dr. FRANCIS DERCUM called the attention of the Academy to the so-called mucous canals, or system of the lateral line in fishes. Up to the year 1850 these structures had been regarded as glandular, that is, as secreting mucus for the purpose of lubricating the general surface of the body. However, the following facts at once strike us as being directly contradictory to this view. In the first place, their size would render them wholly insufficient; secondly, these canals are in most fishes practically closed; and in some fishes actually closed along their entire course. Again, in mollusks in which the surface is equally well lubricated with those of fishes we find no such structures.

After referring to the discoveries of Franz Leydig in 1850, and afterwards to the observations of F. E. Schulze on young teliost fishes, Dr. Dercum offered the following evidence in confirmation of the view that these structures are sensory. Like Leydig he described as occurring at regular intervals in the canals of the head and lateral line certain discoidal bodies, termed by Leydig